Geographic Information Systems (GIS) Geodetic Control Data Standards

STANDARD NO. 603-S1

Adopted: TBD, 2010 **Supersedes:** 601-S1 GIT Standards for Horizontal Datum and Coordinate System **Effective Date:** TBD, 2010 **Revised Date:** N/A	**Approving Authority:** Information Services Board **Also See:** 602-S1 ISB GIT Standard for Metadata

1. Purpose

These standards establish and reference Geodetic Control Data Standards for vertical datum, horizontal datum, and the state's coordinate system used for agency geospatial data, geographic information systems, and data exchanges.

They are designed to improve data quality and accuracy, and simplify the exchange of geodetic control data among state agencies, local, tribal, state, and federal users and producers.

2. Statutory Authority

RCW 43.105.041 details the powers and duties of the Information Services Board (ISB), including the authority to develop statewide or interagency information services and technical policies, standards, and procedures.

RCW 58.20 details the Washington Coordinate System, established by the National Geodetic Survey for defining and stating the positions or locations of points on the surface of the earth within the state of Washington.

2.1. Primary Business Sponsors

Department of Natural Resources (DNR), Department of Ecology (ECY), Department of Transportation (WSDOT), Department of Fish and Wildlife (DFW), and Washington Geographic Information Council (WAGIC).

3. Scope

These standards apply to state of Washington executive branch agencies, agencies headed by separately elected officials, and institutions of higher education referred to as "agency or agencies" throughout this document. Academic and research applications at institutions of higher education are exempt.

4. Key Terms

Geodetic Control – Set of control points whose coordinates are established by geodetic surveying methods such as classical line-of-sight triangulation, traverse, geodetic leveling, and gravimetric or satellite surveys such as Doppler or GPS.

The newer technologies have resulted in more accurate horizontal and vertical control points on the earth's surface and serve as the basis for current vertical and horizontal datum.

Horizontal Datum – A reference surface against which locations on the earth are described, most commonly using latitude and longitude coordinates. They serve as the basis for coordinate systems including the Washington State Plane Coordinate System.

Geographic Coordinate Systems (GCS) – Use a three-dimensional spherical surface to define locations on the earth. A point is referenced by its longitude and latitude values.

Projected Coordinate Systems (PCS) - Are defined on a flat, two-dimensional surface and always based on a GCS.

State plane coordinate systems (SPCS) - Are PCS designed for applications within a state. Washington is divided into two zones - North and South.

Vertical Datum – A reference surface against which elevation and depth are measured on the earth's surface.

5. Standards

Agencies shall use the following Geodetic Control Data Standards for significant new or redesigned agency geospatial datasets, geographic information systems, and data exchanges.

Geodetic Control	State Standard	Owner/ Primary Steward
Horizontal Datum	NAD 83/91 - North American Datum of 1983, with 91 adjustments	NGS
State Plane Coordinate System	Washington Coordinate System of 1983	DNR
Vertical Datum	NAVD 88 - North American Vertical Datum of 1988	NGS

5.1. Horizontal Datum

The North American Datum 1983 (NAD 83), with 1991 (NAD 83/91) adjustments shall be the state standard for Horizontal Datum.

- Reference datum and adjustments in metadata.

5.2. Projected Coordinate System (PCS)

5.2.1. State Plane Coordinate System (SPCS)

- The Washington Coordinate System of 1983 shall be the coordinate system in Washington, per RCW 58.20.120, System designation – Permitted uses.

5.2.2. Unit of Measure and Conversion

- The Standard unit of measure is the U.S. Survey Foot.
- For conversion of coordinates between the meter and the United States survey foot, the meter shall equal exactly 39.37 inches, per RCW 58.20.190 Conversion of coordinates - Metric.

5.2.3. South Zone for Statewide Layers

- Use South Zone for Statewide Layers - For geospatial data maintained as a statewide layer or a regional layer crossing zones, agencies shall use the Washington State Plane Coordinate System 83 South Zone.

5.3. Vertical Datum

The North American Vertical Datum of 1988 (NAVD 88) shall be the state standard for Vertical Datum.

6. Conversion and Adjustment Tools

- NGS Geodetic Tool Kit provides various free online interactive and downloadable software programs and tools for computing, converting, and adjusting geospatial data.
  http://www.ngs.noaa.gov/
- VDatum is a free software tool designed to vertically transform geospatial data among a variety of tidal, orthometric and ellipsoidal vertical datums.
  http://vdatum.noaa.gov/

7. References

- Washington Coordinate System, Chapter 58.20 RCW
  http://apps.leg.wa.gov/rcw/default.aspx?cite=58.20
- National Geodetic Survey (NGS)
  http://www.ngs.noaa.gov/
- Geographic Information Framework Data Content Standard, Part 4: Geodetic Control, 2008
  http://www.fgdc.gov/standards/projects/FGDC-standards-projects/framework-data-standard/GI_FrameworkDataStandard_Part4_GeodeticControl.pdf
- State Plane Coordinate System of 1983, NOAA:
  http://www.ngs.noaa.gov/PUBS_LIB/ManualNOSNGS5.pdf
- NAD83 (NSRS2007) National Readjustment, NOAA
  http://www.ngs.noaa.gov/NationalReadjustment/adjustment_faq.html
- Environmental Systems Research Institute (ESRI)
  http://resources.esri.com

8. Document History

Date	Version	Editor	Changes
August 26, 2010	0.1x	Gwen Gervelis, DNR Dan Saul, ECY Rick Jordan, ECY GIS Technical Workgroup	Initial draft for Vertical Datum, including superseded ISB GIS Standards for Horizontal Datum and Coordinate System
September 16, 2010	0.2	GIS Technical Workgroup	Clarified Scope is for “significant” data sets. Synchronized Horizontal Datum with existing ISB standard. Edits for clarity and readability. Workgroup endorsed.